



Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN4211A Design, install and configure an internetwork

Release: 1

ICTTEN4211A Design, install and configure an internetwork

Modification History

Not Applicable

Unit Descriptor

<p>Unit descriptor</p>	<p>This unit describes the performance outcomes, skills and knowledge required to design, install and configure an enterprise local area network (LAN) and wide area network (WAN) internetwork. It involves testing and troubleshooting an internetwork.</p> <p>The design involves determining network requirements and topology selection for wired and wireless infrastructure. Advanced routing and addressing schemes are also used in the design.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.</p>
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Application of the Unit

<p>Application of the unit</p>	<p>This unit applies to the design, installation and configuration of cable and wireless networks suitable for large, medium and small office home office (SOHO) enterprises.</p> <p>Relevant job roles include designer and installer of IP networks, enterprise internetwork technician, network administrator and network support.</p>
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

<p>Prerequisite units</p>		

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for the design and installation of an internetwork	1.1. Prepare for given work according to occupational health and safety (<i>OHS</i>) and <i>environmental requirements</i> with <i>appropriate personnel</i> 1.2. Identify safety hazards and implement risk control measures in consultation with appropriate personnel 1.3. Determine nature and scope of the <i>internetwork</i> from job briefs and appropriate personnel 1.4. Obtain operating instructions, manuals, hardware and software testing methodologies 1.5. Consult appropriate personnel to ensure the task is coordinated effectively with others involved at the worksite
2. Design an enterprise internetwork	2.1. Produce enterprise <i>internetwork topology</i> after considering technical requirements, physical and financial constraints and expansion projections 2.2. Determine <i>network devices</i> and <i>network resources</i> according to enterprise procedures 2.3. Produce the internetwork design including network security and router and switch configurations to meet design specifications and <i>enterprise procedures</i>
3. Install and configure a designed internetwork	3.1. Install network hardware to network topology design plan according to enterprise procedures 3.2. Determine <i>network addressing scheme</i> for network connectivity and verify using <i>calculations</i> 3.3. Configure routers and switches to perform the logical connection of the internetwork 3.4. Conduct connectivity and performance tests to verify the network installation meets the design specification 3.5. Troubleshoot internetwork and internet connectivity according to manufacturer's specifications and enterprise procedures
4. Complete and document network design and installation	4.1. Restore worksite to safe condition according to established safety procedures 4.2. Record and store <i>essential design and installation information</i> according to enterprise procedures 4.3. Notify appropriate personnel about the completion of the task according to enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to liaise and negotiate with customers and peers to achieve design specifications
- literacy skills to:
 - develop network documentation and maintain network records
 - read and interpret enterprise procedures, manuals and specifications
- numeracy skills to interpret technical data
- planning and organisational skills to plan and prioritise own work
- problem solving skills to:
 - deal with unexpected situations on the basis of safety and specified work outcomes
 - troubleshoot common network problems according to help desk procedures
- safety awareness skills to:
 - apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
 - follow enterprise OHS procedures
 - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
 - analyse the impact of applications on traffic flow in the network
 - apply network design methodologies to design networks that provide a range of services and applications found in larger networks
 - conduct a wireless site survey
 - determine customer requirements and a design specification
 - determine the impact of upgrading hardware and software on network functionality
 - identify the technical requirements, constraints and manageability issues for a given customer network requirement
 - install a network design
 - use tools and equipment

Required knowledge

- enterprise OHS procedures
- open systems interconnect (OSI) layered communication model
- network requirements:
 - applications

REQUIRED SKILLS AND KNOWLEDGE

- lifecycle
- manageability
- quality of service
- network design concepts:
 - business requirements
 - network topologies
 - physical and financial constraints
 - security
 - wired or wireless options
- tool and equipment use
- troubleshooting:
 - impact of network failure
 - maintenance
 - troubleshooting methodology

Evidence Guide

EVIDENCE GUIDE	
<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> • determine customer requirements • design an internetwork that uses advanced routing and addressing techniques • install an internetwork according to design specification • configure network devices to meet design functionality • document internetwork design, installation and configuration.
Context of, and specific resources for assessment	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> • a site where design and installation of an internetwork network may be conducted • use of tools, equipment and materials currently used in industry • relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Methods of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • direct observation of the candidate designing, installing and configuring an internetwork • review of documents prepared by the candidate detailing design and installation • oral or written questioning to assess required knowledge.
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example with:</p> <ul style="list-style-type: none"> • ICTTEN2207A Install and configure a home or small office network • ICTTEN2208A Install and configure a small to

EVIDENCE GUIDE

	<p>medium business network</p> <ul style="list-style-type: none"> • ICTTEN4210A Implement and troubleshoot enterprise routers and switches. <p>Aboriginal people and other people from a non-English speaking background may have second language issues.</p> <p>Access must be provided to appropriate learning and assessment support when required.</p> <p>Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed.</p> <p>In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.</p> <p>Where applicable, physical resources should include equipment modified for people with special needs.</p>
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Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

OHS may include:

- awards provisions
- hazardous substances and dangerous goods codes

RANGE STATEMENT	
	<ul style="list-style-type: none"> • legislation • local safe operation procedures • material safety management systems • protective equipment.
<i>Environmental requirements</i> may include:	<ul style="list-style-type: none"> • dust • excessive energy and water use • excessive noise • fume • gas • liquid waste • smoke emissions • solid waste • vapour.
<i>Appropriate personnel</i> may include:	<ul style="list-style-type: none"> • customer • manager • network manager • site engineer • supervisor.
<i>Internetwork</i> may refer to:	<ul style="list-style-type: none"> • connection of two or more distinct computer networks or network segments via a common routing technology • LAN • WAN.
<i>Internetwork topology</i> may refer to:	<ul style="list-style-type: none"> • physical and logical interconnection between network devices: <ul style="list-style-type: none"> • bus • mesh • ring • star • tree.
<i>Network devices</i> may include:	<ul style="list-style-type: none"> • cable and wireless: <ul style="list-style-type: none"> • router • server • switch.
<i>Network resources</i> may include:	<ul style="list-style-type: none"> • files • printers • software.
<i>Enterprise procedures</i> may	<ul style="list-style-type: none"> • instructions: <ul style="list-style-type: none"> • designs

RANGE STATEMENT	
include:	<ul style="list-style-type: none"> • drawings • job sheets • plans • manufacturer's specifications • operational procedures • reporting and communication • use of tools and equipment.
<i>Network addressing scheme</i> may include:	<ul style="list-style-type: none"> • dynamic • static • subnet.
<i>Calculations</i> may include:	<ul style="list-style-type: none"> • binary addition • binary conversion • binary division • binary multiplication • binary number system • binary subtraction.
<i>Essential design and installation information</i> may include:	<ul style="list-style-type: none"> • configuration • design • installation • installation software • IP addressing schemes • logical and physical diagrams • network administrator codes • passwords • security access codes • troubleshooting reports.

Unit Sector(s)

Unit sector	Telecommunications
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Co-requisite units

Co-requisite units	
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Co-requisite units		

Competency field

Competency field	Telecommunications networks engineering
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